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ABSTRACT

This guide is designed to provide aid and support to library staff in finding government scientific and technical reports. Following an introduction to bibliographic sources for the technical report literature, the guide outlines a general search strategy for the retrieval of technical reports and presents an overview of the following five major indices to technical report literature: (1) Government Reports Announcements and Index (GRAI); (2) EPA (Environmental Protection Agency) Publications Bibliography; (3) Energy Research Abstracts (ERA); (4) Scientific and Technical Aerospace Reports (STAR); and (5) the Monthly catalog (MC) of U.S. Government Publications. Databases available for technical report literature searching, duplication among major technical reports indices, and problems inherent in the bibliographic control of technical report literature are also discussed. Six appendices provide additional information on locating government technical documents, sample entries from the major indices, and listings of selected NASA (National Aeronautics and Space Administration) and EPA reports available to depository libraries. (KM)

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A GUIDE TO LOCATING TECHNICAL REPORTS IN U.S. GOVERNMENT PUBLICATIONS COLLECTIONS

By Mary Hardick
Oklahoma Department of Libraries
First edition, 1987

Metrodocs Monograph One

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Central State University Library
Metropolitan Library System in Oklahoma County
Oklahoma City University Dulaney-Browne Library
Oklahoma Department of Libraries
Southern Nazarene University R.T. Williams Learning Resources Center
University of Oklahoma Bizzell Library
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IR052183

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INTRODUCTION

Library staff usually dread the prospect of dealing with goverment scientific and technical reports. The access methods are quite unique and users are generally apprehensive of a system that arranges materials in such a complicated fashion. It is rare that patrons are able to locate what they want without the assistance of a staff member. The reasons for this are understandable because there is a universe of indexing possibilities. Finding technical reports requires a special technique strategy.

The purpose of this guide is to provide aid and support to those of us who are attempting to deal with these materials by outlining a general search strategy for the retrieval of technical reports, presenting an overview of the five major indexes to technical report literature, and discussing some of the problems inherent in the bibliographic control of the literature. The five major indexes are: Government Reports Announcements and Index (GRAI), EPA Publications Bibliography, Energy Research Abstracts (ERA), Scientific and Technical Aerospace Reports (STAR), and the Monthly Catalog of U.S. Government Publications (MC).

This paper will not discuss the various minor indexes to the technical report literature. These indexes often, although not always, duplicate information which is in GRAI. The appropriate abbreviations will be used in this guide when referring to indexes and agencies (see page 4 for list of abbreviations).

ABBREVIATIONS

AEC	Atomic Energy Commission
DOD	Department of Defense
EPA	Environmental Protection Agency
ERA	Energy Research Abstracts
ERDA	Energy Research and Development Administration
GPO	Government Printing Office
GRAI	Government Reports Announcements and Index
MC	Monthly Catalog of U.S. Government Publications
NASA	National Aeronautics and Space Administration
NRC	Nuclear Regulatory Commission
NSA	Nuclear Science Abstracts
NTIS	National Technical Information Service
STAR	Scientific and Technical Aerospace Reports
Sudocs	Superintendent of Documents of GPO

TECHNICAL REPORT LITERATURE--BIBLIOGRAPHIC SOURCES

Technical reports describe the results of investigations in the sciences, the social sciences, and to a far lesser extent, the humanities. The report is a form of publication intended for the rapid dissemination of information. It is most commonly used to report progress on, and the final results of, scientific investigation. It is usually published by government contractors in response to the reporting requirements of a federal research and development contract.

Citations to technical reports generally have the following six characteristics:

- personal authors
- corporate authors or the names of the institutions where the research was performed
- titles
- contract or grant numbers
- alphanumeric report codes
- dates of publication

The National Technical Information Service (NTIS), a government agency within the U.S. Department of Commerce, is the primary source for indexing and disseminating this information. Established on September 2, 1970 to simplify and improve access to data files and scientific and technical reports produced by federal agencies and their contractors, it is obliged by law to recover its costs from sales to users. Its immediate predecessors were the Office of Technical Services (1946-1964) and the Clearinghouse for Federal Scientific and Technical Information (1964-1970). NTIS is the central source for the public sale of U.S. Government-sponsored research, development, and engineering reports, as well as for foreign technical reports and other analyses prepared by national and local government agencies, their contractors or grantees.

GRAI is a general and primary index to NTIS documents; however, there are three other significant sources that index technical report literature in a similiar fashion to GRAI--STAR, ERA, and EPA Publications Bibliography. See **Appendix One** for a chart summarizing the similarities and differences among the four. STAR, EPA Publications Bibliography, and ERA are subject-oriented sources. They do not attempt to announce all the technical reports that are available on their subjects, but limit coverage to the publications of their agencies. For example, the EPA Publications Bibliography announces reports producing or supporting studies on environmental issues, but only such reports as are produced by or for EPA. However, ERA and STAR do abstract and index some periodical articles held in their agency libraries for which they do not produce microfiche copies. Titles from these citations must be located and retrieved, or borrowed through interlibrary loan. Another general, but less important, index to technical reports is the MC. The number of reports in

this source is much smaller than in GRAI. It does not attempt to be comprehensive for technical reports, announcing only those that were published by GPO or brought to GPO's attention by their issuing agencies. Access to all of these sources is possible in U.S. government publications collections; however, most collections do not house all of the technical report literature cited in these indexes. In recent years more of the reports have been made available to GPO depository libraries, particularly the reports of the Department of Energy (DOE), the National Aeronautics and Space Administration (NASA), the Environmental Protection Agency (EPA), and the Nuclear Regulatory Commission (NRC). The reports of DOE, NASA, the Department of Defense (DOD), and EPA dominate the technical reports available through NTIS, but many other materials are represented. These include technical reports sponsored by other federal agencies, state, municipal, and regional agencies, foreign government, universities, research organizations, and corporations.

Government publications departments also have access to the technical report literature though online databases. The databases available for technical report literature searching are:

NTIS BIBLIOGRAPHIC DATA FILE (updated biweekly) 1964-
(available through BRS, DIALOG, SDC)

GPO MONTHLY CATALOG (updated monthly) July 1976-
(available through BRS, DIALOG)

DOE ENERGY (updated biweekly) 1974-
(available through DIALOG)

The NTIS BIBLIOGRAPHIC DATA FILE database corresponds to GRAI. It is the broadest source for government-sponsored technical reports. GPO MONTHLY CATALOG is the online version of the MC. DOE ENERGY consists of references to publications that include not only the contents of ERA, but additional energy-related materials as well.

SEARCH STRATEGY

Finding technical reports requires special search strategies. The main points to consider when using technical report indexes are as follows:

1. Use GRAI for the most comprehensive coverage.
2. Use STAR, ERA, and EPA Publications Bibliography for individual subject area coverage. These provide better coverage for the given subject. Although they overlap with GRAI, they contain additional materials.

Some technical reports are issued both as GPO depository publications and as NTIS publications. In most government publications collections these reports are arranged by Sudocs numbers and are most easily found in the MC. But remember that all technical reports are more comprehensively indexed in GRAI and the other technical indexes. If a report is found in one of the technical indexes, it must usually be searched for again in the MC to locate it in the collection.

Finally, it is important to remember that NASA publications indexed in GRAI or STAR that are not GPO depository publications, and EPA publications indexed in the EPA Publications Bibliography that are not depository publications, may be obtained directly from the libraries of those agencies at either their national or regional offices, or through interlibrary loan. Technical reports that cannot be obtained through these methods may have to be purchased directly from NTIS.

Following is an example of a typical search strategy for retrieving a report in ERA. This strategy can be applied for document retrieval using the other technical report indexes.

1. In the index section in the back of the volume select the appropriate entry in either the subject index, personal author index, or corporate author index:

   SUBJECT
   AUGER MINING/MINING EQUIPMENT
   Noise control of an underground continuous miner, auger-type, 3:32633 (CONF-7705111-)

   PERSONAL AUTHOR
   Borg, I.Y., New Developments affecting the supply of oil to the Free World, 3:33250 (UCRL-52345)

   CORPORATE AUTHOR
   Florida Univ., Gainesville (USA)
   Quantitative analysis of solute segregation in alloys by transmission electron microscopy. Progress report, January 1, 1977-December 31, 1977, 3:34118 (ORO-4311-5)

   If you know the report number of the technical report desired, the ERA also contains a report number index:

   BDX-
   613-1763 3:33560

2. Using the entry number given,

> Florida Univ., Gainesville (USA)
> Quantitative analysis of solute segregation in alloys by transmission electron microscopy. Progress report, January 1, 1977-December 31, 1977, 3:34118 (ORO-4311-5)

turn to the abstracts section and read the abstract given for the report:

> 34118 (ORO-4311-5) Quantitative analysis of solute segregation in alloys by transmission electron microscopy. Progress report, January 1, 1977-December 31, 1977. Hren, J.J.; Hartley, C.S.
> This report describes the results of a computer simulation of images for the FCC and BCC infinitesimal loops using isotropic elasticity...

3. If you then decide that you want the report, the next step is to determine whether it has been received as a depository item. A depository item entry should be marked with a "DEP" for depository. For the ERA, the "DEP" markings are given with each entry if they are depository items:

> 32878 (DOE/ET-0036) Guide to solar energy programs. (Department of Energy, Washington, D.C. (USA). Dev. of Solar Technology) Mar. 1978. 72p. Dep. NTIS, PC A04/MF A01

For most of the issues of the older index Nuclear Science Abstracts, you must consult the "Cumulative Report Number Index" volumes to determine if the entry is a depository item. All report numbers for the period of time the index covers are in numerical order within those volumes:

> IS-
> 5380 17-16518 Dep.; CFSTI; Trans. Met. Soc. AIME, 227:717-23 (1963)

4. Retrieve the microfiche. Most depository libraries file DOE microfiche by their report code numbers.

GOVERNMENT REPORTS ANNOUNCEMENTS AND INDEX (GRAI)

Bibliography of Science and Industrial Reports
January 1946-June 1949
Sudocs classification number: C 35.7:(vol./no.)

Bibliography of Technical Reports
July 1949-September 1954
Sudocs classification number: C 35.7:(vo./no.)

U.S. Government Research Reports
October 1954-December 1964
Sudocs classification number: C 41.21:(vol./no.)

U.S. Government Research and Development Reports
January 1965-March 1971
Sudocs classification number: C 51.9/3:(vol.no.)

Announcements and Index
March 1971-1975
Sudocs classification number: C 51.9/3:(vol./no.)

Government Reports Announcements and Index (GRAI)
1975-
Sudocs classification number: C 51.9/3:(vol./no.)

Government Reports Annual Index
1971-
Sudocs classification number: C 51.9/4:(year/numbers/
section numbers)

GRAI is the basic and most comprehensive index for locating technical reports. It has been published semimonthly since 1975. Each issue contains abstracts arranged by 22 main subject categories. Each category is further divided into subcategories. The abstract gives the NTIS order number, a number which may also be used to arrange NTIS reports in some libraries. There are five indexes in each issue: keyword index, personal author index, corporate author index, contact/grant number index, and NTIS order/report number index. See **Appendix 2** for sample GRAI indexes and abstracts. A set of cumulative indexes is published at the end of each year. Beginning in late 1982 GRAI began to list Sudocs numbers for NASA publications in the abstracts and NTIS order/report number indexes. From 1984 on, the indexes in each issue, and the cumulative indexes, refer users to an abstract number. The indexes prior to 1984 refer users to a GRAI issue and page. Reports can be located on the pages of later issues of GRAI by the NTIS order number. Prior to 1980, the index refers the user to the GRAI issue and subject code. At that time, the NTIS order code had to be used to find the abstract within the specificed subject category.

Reports can sometimes be identified as belonging to particular depository series. For example, DOE reports are often given the Sudocs numbers E 1.28:(numbers) or E 1.99:(numbers). EPA and NASA reports may also fit into easily identified series. See **Appendix 3** for NASA and EPA reports available as depository items. **Appendix 4** shows an abstract page from GRAI in which some Sudocs numbers are included. Abstract 431,361 is a NASA contract publication, and the Sudocs number assigned to it is NAS 1.26:171730. Other publications listed may or may not have Sudocs numbers. The number immediately under the abstract number is the NTIS order number. To the right are price codes. It is important to use only the latest issue of the GRAI for current price code information. Price information is listed on the back, outside cover of each biweekly issue. The NTIS BIBLIOGRAPHIC DATA FILE, the online version of GRAI, is available from 1964 to date. This file may be accessed through DIALOG, BRS, and SDC.

The Corporate Author Authority List--1983 (NTIS, 1983, Sudocs classification number: C 51.18:983) is an authority file for corporate authors. Anyone who works with technical reports on a regular basis will find this file useful. For example, you would not find any publications by the "Bureau of Natural Gas" in the GRAI corporate author index, but by using the Authority List you would find that their publications are indexed in the corporate author index
as "Federal Energy Regulatory Commission, Washington, D.C., Bureau of Natural Gas."

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS (STAR)

Scientific and Technical Aerospace Reports (STAR) 1963-
Sudocs classification number: NAS 1.9/4:(vol./no.)

Scientific and Technical Aerospace Reports Annual Indexes (STAR) 1963-
Sudocs classification number: NAS 1.9/5:(vol./nos./pts.)

STAR has been published semimonthly since 1963. It covers technical reports in aeronautics, space, and related areas, including aerospace aspects of earth resources, energy, and the environment. It abstracts and indexes NASA reports, reports of NASA contractors and grantees, and relevant reports from other government agencies and nongovernmental institutions. There is considerable duplication of entries between STAR and GRAI. Most STAR entries are also found in the more comprehensive GRAI. Abstracts are arranged by 10 major subject divisions which are further divided into subcategories. There are five indexes in each issue: subject index, personal author index, corporate source index, contract number index, and report/accession number index. Indexes in individual issues give references to NASA accession numbers by which the abstracts are arranged. Annual indexes give references to issue number, page, and accession number. See **Appendix 5** for an example of a STAR abstract.

Since 1982, Sudocs numbers have been included for NASA publications when appropriate. Note: when Sudocs numbers are not included, it may be necessary to convert the report number to a Sudocs number using a chart, such as the NASA chart in Appendix 3, as a guide, in order to retrieve the report.

NOTE FOR OKLAHOMA SELECTIVE DEPOSITORY LIBRARIES: Many non-depository NASA publications are available through the two regional depository libraries in the state: the U.S. Documents Division at the Oklahoma Department of Libraries; and the Documents Department at Oklahoma State University. When you contact either of these depositories, you should be prepared to give them the appropriate NASA "N" number for non-depository NASA microfiche (for example, "N76-1693").

U.S. Documents Division, Oklahoma Department of Libraries
(405) 521-2502, ext. 252/253
1-800-522-8116
Has NASA microfiche from 1962-1970; can get NASA microfiche from 1971 to date directly from Federal Aviation Administration Library and make a microfiche copy for you.

Documents Department, Oklahoma State University
(405) 624-6546
Has NASA microfiche from 1969 on; can get NASA microfiche copies from 1962-1969 from Oklahoma Department of Libraries.

ENERGY RESEARCH ABSTRACTS (ERA)

Nuclear Science Abstracts
1948-June 1976
Sudocs classification numbers: Y 3.At 7:16-(vol./no.)
ER 1.10:(vol./pts.)

Energy Research Abstracts
July 1976-
Sudocs classification number: E 1.17:(vol./no.)

Energy Research Abstracts Annual Index
July 1976-
Sudocs classification number: E 1.17:(vol./ind/pts.)

Energy Research Abstracts has been published biweekly since 1977. DOE technical reports cover all fields of energy--from coal and petroleum to nuclear, solar, and geothermal. They also cover all aspects of these energy sources, such as nuclear materials security, environmental technology, health and safety aspects, nuclear raw materials, and petroleum plant quality.

DOE technical reports are accessed through several sets of abstracts. The Atomic Energy Commission (AEC) issued Nuclear Science Abstracts (NSA) from 1948 to 1974. In 1974 the AEC was abolished and replaced by the Nuclear Regulatory Commission and the Energy Research and Development Administration (ERDA). ERDA continued to issue NSA through June of 1976. Then, the title was changed to Energy Research Abstracts (ERA). ERDA continued to issue ERA until this agency was abolished in 1977. Since then, the Department of Energy has issued ERA.

Despite the changes in issuing agency, the indexes function alike. There are five indexes in each issue: corporate author index, personal author index, subject index, contract number index, and report number index. Generally, you must consult the "Cumulative Volumes" in NSA to determine if the entry is a depository item. All report numbers for the period of time the index covers are in numerical order within the NSA volumes.

DOE uses acronyms for all of its documents, such as "SAND" for Sandia Laboratories, or "CONF" for conference. A "CONF" document is identified by a number which indicates the date on which the conference was held. For example, "CONF-781248" can be understood as: "78", the year the conference was held; "12", the month the conference was held; and "48", the number of the conference held during 1978.

See **Appendix 6** for a sample page from ERA.

NOTE FOR OKLAHOMA SELECTIVE DEPOSITORY LIBRARIES: The Government Publications Collection at the University of Oklahoma Bizzell Library has been a depository for DOE microfiche since 1948. They have the most complete collection of DOE microfiche in the state, including many that GPO depository libraries do not receive. The early AEC collection is on microcard; a microcard reader is needed in your library to read these documents. You should borrow DOE microfiche from OU through interlibrary loan.

Government Publications Collection, University of Oklahoma Bizzell Library (405) 325-3141

ENVIRONMENTAL PROTECTION AGENCY (EPA) SOURCES

EPA Cumulative Bibliography, 1970-1976 (1977)
Sudocs classification number: EP 1.21/7-2:970-976/pts.1,2

EPA Publications Bibliography, 1977-1983 (1983)
Sudocs classification number: EP 1.21/7-2:977-83/pts.1,2

EPA Publications Bibliography; Quarterly Abstract Bulletin 1970-
Sudoc classification number: EP 1.21/7:(year/no.)

EPA Publications Bibliography; Quarterly Abstract Bulletin lists all technical reports and journal articles submitted to NTIS by EPA. It has been published since 1970. The final issue for each year contains cumulative annual indexes (but not cumulative abstracts). There are seven indexes in each issue: index, keyword index, sponsoring EPA Office index, corporate author index, personal author index, contract/grant number index, and NTIS Order/Report number index. The cumulative indexes give references to the issue number and the NTIS order number. Abstracts in each issue are arranged by NTIS numbers (for example, PB 82-180472). Individual issues reference NTIS numbers in the index. The EPA Cumulative Bibliography, 1970-1976, and the EPA Publications Bibliography, 1977-1983 replace the quarterly abstracts. The EPA Cumulative Bibliography has no sponsoring EPA office index.

The EPA indexes do not give Sudocs numbers, although some of the publications are sent to depository libraries. See **Appendix 3** for a selected list of depository series which generally correspond to EPA number series. Even though these series correspond to EPA number series, not all issues in the series are sent to depository libraries; some may still appear in other depository series.

All of the titles listed in EPA Publications Bibliography are also listed in GRAI, but this source is superior for those needing only EPA reports. It contains title and sponsoring agency indexes not found in GRAI.

See **Appendix 8** for a sample page from the Bibliography.

NOTE FOR OKLAHOMA SELECTIVE DEPOSITORY LIBRARIES: The two regional depository libraries in the state, the U.S. Documents Division at the Oklahoma Department of Libraries and the Documents Department at Oklahoma State University can get non-depository EPA microfiche for your library by contacting a Federal library. When you contact either of these depositories, you should be prepared to give them a "PB" number as found in these indexes.

U.S. Documents Division, Oklahoma Department of Libraries
1-800-522-8116, (405) 521-2502, ext. 252/253

Documents Department, Oklahoma State University
(405) 624-6546

MONTHLY CATALOG OF U.S. GOVERNMENT PUBLICATIONS

Monthly Catalog of U.S. Government Publications
Sudocs classification number: GP 3.8:(year/no.)

Most technical reports sent to GPO depository libraries are indexed in MC. The main exceptions are DOE reports, many of which are indexed only in ERA. Many of the technical reports indexed in the MC are also NTIS reports, but most NTIS reports are not depository and not indexed in the MC.

ONLINE DATABASES

The databases available for technical report literature searching are:

NTIS BIBLIOGRAPHIC DATA FILE (updated biweekly) 1964-
(available through BRS, DIALOG, SDC)

GPO MONTHLY CATALOG (updated monthly) July 1976-
(available through BRS, DIALOG)

DOE ENERGY (updated biweekly) 1974-
(available through DIALOG)

There are many advantages to online searching compared to manual searching that staff should consider when patrons request assistance. Online searching increases search options, is less tedious, and usually identifies more up-to-date information.

DUPLICATION AMONG MAJOR TECHNICAL REPORTS INDEXES

There is a significant amount of overlap among the major bibliographic sources for the technical reports discussed in this guide. The results of a study completed in 1981 concluded that GRAI indexed 94.3 percent of technical reports that appeared in STAR and 78.8 percent of those that appeared in ERA. Forty-one percent and 21 percent of the technical report entries in GRAI appeared in STAR and ERA respectively (Aluri, Rao and Judith Schiek Robinson, A Guide to U.S. Government Scientific and Technical Resources, 1983, p. 45). This indicates that GRAI is the major source for information on technical reports available in the U.S. There is some overlap between MC and GRAI. Most studies indicate that approximately 20-30 percent of the items listed in MC are available from NTIS. The overlap is not always obvious. For example, MC does not mention that a document whose report number is NBS-SP-596 is available both in paper copy and microfiche formats from NTIS; at the same time GRAI does not mention that it is available for sale from the Superintendent of Documents. Furthermore, in a federal documents collection, NBS-SP-596 is physically located under the Sudocs classification number of C 13.10:596. The same report is given an accession

number of PB81-124984 by NTIS. See Appendix 9 for an example of duplication. It is also important to note that there is usually a subtantial price difference between NTIS and GPO for the same publication (provided that GPO sells it at all).

BIBLIOGRAPHIC CONTROL OF TECHNICAL REPORT LITERATURE

The report series code is one of the most essential bibliographic elements for obtaining positive identification of a technical report to aid in its acquisition. Report series codes are numbers assigned to technical reports either as report/accession numbers or as contract/grant numbers. The report/accession numbers are designed to provide unique identification for each technical report, regardless of its type. The contract/grant numbers are designed to identify all reports which are generated as part of a particular contract or grant. These numbers tie together reports which pertain to the same project. There are thousands of report series codes, assigned by hundreds of organizations and agencies. This multitude of separate report series codes has resulted in great complexity in the identification of report series and individual technical reports. The problem is increased by the fact that some reports are assigned more than one number. Initially there is a contract/grant number, and later one or more report/accession numbers may be assigned to a report. These numbers can reflect the original contractor, the sponsoring agency, the clearinghouse that distributes the report, or all of these.

The Dictionary of Engineering Document Sources (Global Engineering Documents, 1985, ISBN 0-912702-31-1) cross-indexes report codes assigned to technical reports by both government and industry sources. It is a valuable resource for anyone who works with technical reports on a regular basis.

The quality of bibliographic control of technical reports has improved substantially over the years. Reports are announced more promptly, the quality of bibliographic entries is better, and the quality of their indexing has improved notably. In spite of these improvements, there are still reports that are not listed in the major indexing and abstracting services responsible for announcing government-sponsored reports. To some extent, this situation exists because of the persistent practice of some agencies to utilize their own announcement and distribution systems and not to make use of the various centralized systems. The effect of this is to fragment the sources of access to bibliographic records on the technical report literature. Librarians in general, and U.S. government publications librarians in particular, can only hope that this situation improves.

U.S. Documents Division, September 18, 1987

Locating Technical Reports

The following chart summarizes the similarities and differences among *GRA&I, EPA Publications Bibliography, STAR* and *ERA*.

	GRA&I	EPA Publications Quarterly	STAR	ERA
Abstracts	✓	✓	✓	✓
Indexes by Subjects	✓	✓	✓	✓
by Corporate Authors	✓	✓	✓	✓
by Personal Authors	✓	✓	✓	✓
by Contract/Grant Numbers	✓	✓	✓	✓
by Report/Accession Numbers	✓	✓	✓	✓
by Titles				✓
by Sponsoring Agencies				✓
On-line Availabilities	1964-Present	1960-Present	1962-Present	Late 1800's-Present

Locating Technical Reports

Keyword Index:

The Keyword Index is arranged alphabetically according to subject headings. Entries provide titles of documents, pages on which the abstracts are located and NTIS accession numbers or alphanumeric acquisition codes. The code used most often, "PB," which relates to the former Publications Board, is applied to materials prepared outside NTIS, but indexed and abstracted by that agency. Since 1980, two digits representing the year in which the reports were entered into the NTIS system have followed the PB's. Other common accession schemes are:

AD—Department of Defense reports

DOE—Department of Energy reports

E—NASA reports relating to LANDSAT, a satellite mapping program

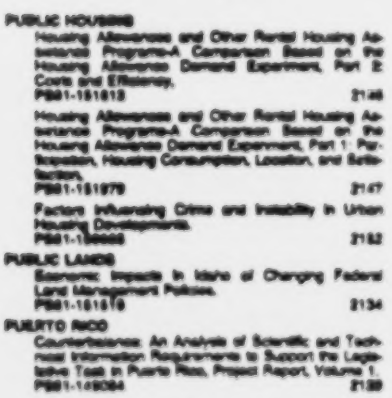
EIS—environmental impact statements

N—NASA reports other than those relating to LANDSAT

NTIS—reports prepared by NTIS prior to 1980. Since that time PB has been applied to these documents.

NUREG—Nuclear Regulatory Commission reports. Both PB and NUREG codes were assigned to these documents between 1975 and June 1979. Since then, NUREG has been used exclusively.

Figure 9-1
GRA&I, Volume 81, number 11
Keyword Index


PUBLIC HOUSING
Housing Allowances and Other Rental Housing Assistance Programs-A Comparison Based on the Housing Allowance Demand Experiment, Part 2: Costs and Efficiency,
PB81-151813 2146
Housing Allowances and Other Rental Housing Assistance Programs-A Comparison Based on the Housing Allowance Demand Experiment, Part 1: Participation, Housing Consumption, Location, and Satisfaction,
PB81-151979 2147
Factors Influencing Crime and Instability in Urban Housing Developments,
PB81-1 2152
PUBLIC LANDS
Economic Impacts in Idaho of Changing Federal Land Management Policies,
PB81-1 2154
PUERTO RICO
Counterbalance: An Analysis of Scientific and Technical Information Requirements to Support the Legislative Task in Puerto Rico, Project Report, Volume 1,
PB81-1 2159

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Abstracts:

Consult the Abstract section to obtain full bibliographic information and summaries of the documents after noting relevant entries in the index. Abstract citations usually have nine parts.

1. **Accession numbers.**
2. **Availability statements and price codes: Indicates if documents are available from NTIS in paper (PC) and/or microfiche (MF). Tables on the back covers of *GRA&I* decipher the price codes.**
3. **Issuing agency.**
4. **Titles.**
5. **Personal authors.**
6. **Dates of publication.**
7. **Paginations.**
8. **Report numbers.**
9. **Abstracts.**

Grant or contract numbers are sometimes indicated as well.

PB81-169856, the citation referred to in figure 9-1, appears in the abstract section as indicated in figure 9-2.

Figure 9-2

GRA&I, Abstracts, Volume 81, number 11

1. PB81-169856 MF A01 2.
3. National Inst. of Law Enforcement and Criminal Justice, Washington, DC.
Factors Influencing Crime and Instability in Urban Housing Developments. 4
Executive Summary,
5. Oscar Newman, and Karen A. Franck, Aug 80, 6.
7. 51p HUD-0001799
8. This executive summary condenses the information of a much larger document produced under grant from the National Institute of Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, U.S. Department of Justice. The purpose of the study was to investigate certain 'built - in' characteristics of federally - assisted housing projects to determine whether those characteristics contribute to crime, fear, and instability and, if so, which of these are most contributory. Emphasis is given to examination of the role played by physical factors such as entry ways, adjacent common grounds, building layout and site design, real barriers (fences, locks, intercoms), and the presence of security personnel. Newark, St. Louis, and San Francisco provided the 63 federally - assisted, moderate - income developments studied. The developments consist of row house, walk - up, and high - rise buildings with a varied composition of rent - subsidized residents. Path analysis is used to estimate the model and to calculate total, direct, and total indirect effects. Major findings, directions for future research, and policy implications are discussed. Tables, graphs, and references are included.
9.

Figure 9-3

GRA&I, Volume 81, number 11

Corporate Author Index

NATIONAL INST. OF ALLERGY AND INFECTIOUS DISEASES, BETHESDA, MD.

DHEW/NIH/PUB-81-2216
New Initiatives in Immunology.
PB81-167844 2182

NATIONAL INST. OF LAW ENFORCEMENT AND CRIMINAL JUSTICE, WASHINGTON, DC.

Factors Influencing Crime and Instability in Urban Housing Developments.
(HUD-0001788)
PB81-186858 2152

NATIONAL LIBRARY OF MEDICINE, BETHESDA, MD.

NLM-MED-81-01
List of Serials and Monographs Indexed for Online Users, 1981.
PB81-186469 2133

NATIONAL MARINE FISHERIES SERVICE, GALVESTON, TX. GALVESTON LAB.

NOAA-TM-NMFS-SEFC-30
Commercial Brown, White and Pink Shrimp Tail Size: Total Size Conversions.
(NOAA-82119710)
PB81-146488 2184

Personal Author Index

NEWMAN, J. B.

Thermomechanical Theory of Materials Undergoing Large Elastic and Viscoplastic Deformation (AWBA Development Program).
WAPD-TM-1472 2291

NEWMAN, OSCAR

Factors Influencing Crime and Instability in Urban Housing Developments.
PB81-186858 2152

NEWMAN, THOMAS H.

Reprint: Organosilyl Substituted Phosphoranyl Radicals.
AD-A093 885/8 2186

NEWMAN, S. E.

Multiple-Shot Laser Damage Thresholds of Ultraviolet Reflectors at 248 and 308 Nanometers.
LA-UR-80-3439 2287

NEWTON, MURRAY

Basic Administrative Models for Toxic Substances Management, Toxics Integration Policy Series.
PB81-147373 2179

NICHOLS, HENRY

Site Symmetry of Surface Adsorbed Molecules.
AD-A093 804/3 2184

NICHOLSON, FRANCIS H.

Vortex Modeling.
AD-A093 795/8 2138

NTIS Order/Report Number Index:

The same document is indexed in the NTIS Order/Report Number Index as illustrated below. (figure 9-4)

Figure 9-4

GRA&I, Volume 81, number 11
NTIS Order/Report Number Index

NTIS Order or Accession Number

PB81-186849

Soviet Housing and Urban Design.
PB81-186849 2252 PC A06/MF A01

PB81-186858

Factors Influencing Crime and Instability in Urban Housing Developments.
PB81-186858 2152 MF A01

PB81-866894

Library Management, 1978-January, 1981 (Citations from the NTIS Data Base).
PB81-802084 2133 PC N01/MF N01

Report Number

HUD-0001788

Factors Influencing Crime and Instability in Urban Housing Developments.
PB81-186858 2152 MF A01

HUD-0001798

Survey of Homeowner Experience with New Residential Housing Construction.
PB81-151821 2146 PC A10/MF A01

HUD-0001811

Intrajurisdictional Property-Tax Capitalization.
PB81-151839 2134 PC A10/MF A01

HUD-0001824

How Housing Allowances Affect Housing Markets: Supply Experiment Interim Findings. Housing Assistance Supply Experiment.
PB81-151847 2146 PC A03/MF A01

Corporate, Personal Author, and NTIS Order/Report Number Indexes--GRAI

Contract/Grant Number Index:

Since a contract or grant number was excluded from the abstract to the document in question, a second citation is used to illustrate the Contract/Grant Number Index. (figure 9-5)

Figure 9-5

GRA&I, Volume 81, number 11

Contract/Grant Number Index

HUD-H-7684
HUD USER, Germantown, MD.
PB81-168724 2151
PB81-168732 2151
PB81-168740 2151

HUD-H-2979
Abt Associates, Inc., Cambridge, MA.
PB81-151854 2146

HUD-H-2982
Urban Inst., Washington, DC.
PB81-151888 2146

HUD-H-2916/9B
John F. Kennedy School of Government, Cambridge, MA.
PB81-151839 2134

HUD-H-5040
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.
PB81-168831 2152

HUD-H-5066/9B
National Opinion Research Center, Chicago, IL.
PB81-168781 2131

HUD-H-6108B
Woodrow Wilson International Center for Scholars, Washington, DC.
PB81-168848 2252

HUD-H-6233
Northeast Ohio Areawide Coordinating Agency, Cleveland.
PB81-151920 2147

Abstracts

PB81-168831 PC A07/MF A01
Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.
Residential Energy Efficiency Standards Study.
Final rept.
Jul 80, 144p HUD/PDR-814, HUD-0001733
Contract HUD-H-5040

This is the final report to the Congress on the Residential Energy Efficiency Standards Study conducted by HUD in coordination with other Federal agencies as directed in Section 253 of the National Energy Conservation Policy Act of 1978 (Public Law 95 - 619). Six major issue areas address the concerns raised in the legislation, including the feasibility of developing an energy efficiency standard for existing units, the amount of energy that would be saved by the implementation of a mandatory standard over and above the energy savings estimated as resulting from current programs, and the impact of such a standard on individual households. Other concerns are how the implementation would affect credit availability and related financial matters, how it would affect the building community, and what major administrative options are available to implement the Section 253 requirement. This document integrates and highlights the findings of the principal support contractors. It presents contractors' findings and recommendations concerning the feasibility of a mandatory regulatory action as described in Section 253 and on related energy conservation policies and initiatives. Based on this technical work, the HUD recommendation does not favor a federally mandated time - of - sale program. The legislation and technical analysis information are appended.

Selected NASA Technical Reports Available to Depository Libraries

NAS1.12/7:	Jet Propulsion Laboratory: Publications (numbered). Item 830-H-9.
NAS1.15:	Technical Memorandums. Item 830-D (MF).
NAS1.19:	NASA EP (series). Item 830-G.
NAS1.20:	NASA Facts. Item 830-H.
NAS1.21:	NASA SP (series). Item 830-I.
NAS1.26:	NASA Contractor Reports (numbered). Item 830-H-14 (MF).
NAS1.55:	Conference Publications NASA CP (series). Item 830-H-10 (MF).
NAS1.60:	NASA Technical Papers (numbered). Item 830-H-15 (MF).
NAS1.61:	NASA Reference Publications, RP (series). Item 830-H-11.

Selected EPA Report Series Available to Depository Libraries

EPA- (numbers)	SuDocs	Series Title	Item	
600/1	EP1.23/4:	Environmental Health Effects Research Series.	431-I-23	(MF)
600/2	EP1.23/2:	Environmental Protection Technology Series.	431-I-12	(MF)
600/3	EP1.23:	Ecological Research Series.	431-I-11	(MF)
600/4	EP1.23/5:	Environmental Monitoring Series.	431-I-24	(MF)
600/5	EP1.23/3:	Socioeconomic Environmental Studies Series.	431-I-19	(MF)
600/7	EP1.23/8:	Interagency Energy-Environment Research and Development Reports.	431-I-62	(MF)
600/8	EP1.23/8:	Interagency Energy-Environment Research and Development Reports.	431-I-62	(MF)
	EP1.23/9:	EPA Special Reports.	431-K-12	
600/9	EP1.23/6:	Miscellaneous Series.	431-J	(MF)
	EP1.23/8:	Interagency Energy-Environment Research and Development Reports.	431-I-62	(MF)
650/4	EP1.23/5	Environmental Monitoring Series.	431-I-24	(MF)
660/2	EP1.23/2	Environmental Protection Technology Series.	431-I-12	(MF)
660/3	EP1.23:	Ecological Research Series.	431-I-11	(MF)
670/2	EP1.23/2:	Environmental Protection Technology Series.	431-I-12	(MF)

Sample Page from Government Reports Announcements and Index (GRAI)

Field 13—MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

Group 13A—Air Conditioning, Heating, Lighting, and Ventilating

Concept Study of an Automatic Differential Mirror Furnace Facility, Prophase A. Volume 2: Technical Descriptions.
Final Report.
J. Stapparmann. 1983. 117p ERC-RP-309-DB-009-V-2, ESA-CR(P)-1812-V-2
Contract ESA-4952/81/F-PC (SC)

A 1500 C (max) mirror furnace for materials science experiments and for growing 40 mm crystals under microgravity in an add-on payload for a retrievable carrier is proposed. Parts of the Spacelab mirror furnaces which can be used are identified. Design solutions for modifications due to experimental requirements or to the automatic operation mode are developed. The complete new parts of the facility, such as the sample storage and exchange mechanism (SSEM) were investigated, and design solutions are presented. A design featuring two monoellipsoidal mirror furnaces with the SSEM situated in between, and no active control is favored.

431.361
N84-17533/1 PC A06/MF A01
Vought Corp., Dallas, TX.
Development of a Contact Heat Exchanger for a Constructable Radiator System.
H. R. Howell. 1 Jul 83. 120p [NASA-CR-171730]
REPT-2-53200/3R-53480, NASA-CR-171730
Contract NAS9-14907

A development program for a contact heat exchanger to be used to transfer heat from a spacecraft coolant loop to a heat pipe radiator is described. The contact heat exchanger provides for a connectable/disconnectable joint which allows for on-orbit assembly of the radiator system and replacement or exchange of radiator panels for repair and maintenance. The contact heat exchanger does not require the transfer of fluid across the joint; the spacecraft coolant loop remains contained in an all welded system with no static or dynamic fluid seals. The contact interface is also 'dry' with no conductive grease or interstitial material required.

431.362
PAT-APPL-6-463 969 PC A02/MF A01
Department of Energy, Washington, DC.
Means and Method for Vapor Generation.
Patent Application.
L. W. Carlson. 1984. 20p DE84005984
Contract W-31-109-ENG-38
The Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A liquid, in heat transfer contact with a surface heated to a temperature well above the vaporization temperature of the liquid, will undergo a multiphase (liquid-vapor) transformation from 0% vapor to 100% vapor. During this transition, the temperature driving force or heat flux and the coefficients of heat transfer across the fluid-solid interface, and the vapor percentage influence the type of heating of the fluid - starting as free-water heating where no vapors are present, progressing to nucleate heating where vaporization begins and some vapors are present, and concluding with film heating where only vapors are present. Unstable heating between nucleate and film heating can occur, accompanied by possibly large and rapid temperature shifts in the structures. This invention provides for injecting into the region of potential unstable heating and proximate the heated surface superheated vapors in sufficient quantities operable to rapidly increase the vapor percentage of the multiphase mixture by perhaps 10 to 30% and thereby effectively shift the multiphase mixture beyond the unstable heating region and up to the stable film heating region. (ERA citation 09:012498)

431.363
PAT-APPL-6-571 014 PC A03/MF A01
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
High Gradient Directional Solidification Furnace.
Patent Application.
B. R. Aldrich, and W. D. Whitt. Filed 17 Jan 84. 18p
NASA-16531/5, NASA-CASE-MFS-21863-1
The Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A high gradient directional solidification furnace is disclosed which includes eight thermal zones throughout the length of the furnace. In the hot end of the furnace, furnace elements provide desired temperatures. These elements include Kanthrome wire resolved on a grooved tube which is encapsulated by an outer alumina cone. A booster heater is provided in the hot end of the furnace which includes tantalum/tungsten/rhenium wire which has a capability to put heat quickly into the furnace. An adiabatic zone is provided by an insulation barrier to separate the hot end of the furnace from the cold end. The cold end of the furnace is defined by additional heating elements. A heat transfer plate provides a means by which heat may be extracted from the furnace and conducted away through liquid cooled jackets. By varying the input of heat via the booster heater and output of heat via the heat transfer plate, a desired thermal gradient profile may be provided.

431.364
PATENT-4 426 864 Not available NTIS
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Steamized Coal Burner Facility.
Patent.
F. O. Cuffe, and M. W. Luoton. Filed 30 Jun 82, patented 17 Jan 84, 6p NAS-16275/7, PAT-APPL-6-393 588
Supersedes PAT-APPL-6-393 588, N82-31788 (20 - 22, p 3149).
The Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231, $1.00.

A combustor or burner system in which the ash resulting from burning a coal in oil mixture is of submicron particle size is described. The burner system comprises a burner section, a flame exit nozzle, a fuel nozzle section, and an air tube by which preheated air is directed into the burner section. Regulated air pressure is delivered to a fuel nozzle. Means are provided for directing a mixture of coal particles and oil from a drum to a nozzle at a desired rate and pressure while means returns excess fuel to the fuel drum. Means provide for stable fuel pressure supply from the fuel pump to the fuel nozzle.

431.365
PB84-157031 PC E04/MF E01
Helsinki Univ. of Technology, Espoo (Finland). Dept. of Technical Physics.
Numerical Model for Seasonal Storage of Solar Heat in the Ground by Vertical Pipes.
P. O. Lund, and M. B. Oosterman. 24 Nov 83. 52p TKK-F-A532, ISBN-951-753-104-4

A three-dimensional numerical model for seasonal heat storage in the ground by vertical heat exchanger pipes is presented. The model also accounts for convective heat flows in the ground. The storage is employed in a district solar heating system with a heat pump. The effects of storage volume, storage medium, collector area, and collector type on system performances are studied for the Helsinki (60 degrees N) climate. Economic optimization of the storage and collector installation is also shortly discussed. For a 500-house community, a collector area of 38 square meters per house and a rock storage volume of 550 cubic meters per house would provide a solar fraction of 70 per cent.

431.366
PB84-157304 PC E04/MF E01
Helsinki Univ. of Technology, Espoo (Finland). Dept. of Technical Physics.
Effects of Solar Radiation Variations on Solar Heating System Performances.
P. O. Lund. 29 Sep 83. 30p TKK-F-A529, ISBN-951-753-012-9

The effect of solar radiation availability on the performance of different solar heating systems has been studied. The systems include a solar water heater, passive solar houses and district solar heating systems with seasonal heat storage. Also different collector orientations and collector types were investigated. The hourly radiation data were generated by a simple computational simulation procedure. It was found that district solar heating systems with concentrating collectors and passive solar houses showed largest variations for the given conditions.

431.367
PB84-169276 PC A10/MF A01
International Flame Research Foundation, Ijmuiden (Netherlands).
Burner Criteria for NOx Control, Volume 3, Heavy-Oil and Coal-Fired Furnaces and Further Furnace Investigations.
Final rept. Jul 75-Jul 78,
M. P. Heap, T. M. Lowes, R. Walmsley, H. Bartelds, and P. LeVasseur. Feb 84, 220p EPA-600/7-84-0158
Contract EPA-68-02-0202
See also PB84-153253.

The report describes the third phase of a research program with the overall objective of specifying burner design criteria for minimum pollutant emissions from both pulverized-coal- and residual-fuel-oil-fired combustors. A distributed mixing burner was developed, and its potential for NOx control was evaluated for different fuels. The burner produces a fuel-rich zone that reduces the conversion of fuel nitrogen species to NOx. Injecting additional air from outboard ports completes fuel oxidation. It was postulated that achievable NOx control depended on nitrogen volatility and oxygen content. This was confirmed by burning coal, a low volatile petroleum coke, heavy fuel oil, and a heavy fuel oil/water emulsion. A television pyrometer flame diagnostic technique that was evaluated gave promising results.

431.368
PB84-170639 PC A04/MF A01
Green (Del) Associates, Inc., Woodburn, OR. Environmental Technology Div.
Residential Wood Combustion Study. Task 4. Technical Analysis of Wood Stoves: Combustion Principles, Design Considerations, Operating Techniques.
Final rept.
Mar 83, 75p EPA-910/9-82-088F
Contract EPA-68-02-3568
See also PB84-170612, and PB84-170638.

Design and operation of residential wood combustion devices influence both performance and emissions. Important design considerations include mechanisms to increase thermal efficiency and improve combustion efficiency. Operator-controlled variables such as fuel, charging rate, and combustion air regulation greatly impact performance and emissions. An overview of general information on fireplaces and woodstove design and operation, based on a literature review, is provided in this report. Basic combustion principles, efficiencies and combustion variables are discussed. The influence of design configurations on combustion with the resultant formation of pollutants is investigated. Modification of the combustion system and the heat transfer mechanism by design or retrofit is explored. The impact of fuel species, fuel moisture content and operational variables are discussed. Techniques for proper stove selection, particularly sizing of the stove for needed heat output, are described. Design parameters and firing techniques recommended to operate a stove or fireplace with minimum emissions are discussed. A bibliography of relevant technical reports is provided.

431.369
PB84-862655 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Fluorescent Lamps and Lighting Systems, 1975-August, 1982 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for 1975-Aug 82
Mar 84, 275p

This bibliography contains citations concerning fluorescent lamp and fluorescent lighting system technology. Design, development, manufacture and applications are presented. Characteristics, performance evaluations, energy efficiency, controls, materials, trends and innovations are also discussed. (The updated bibliography contains 323 citations, none of which are new entries to the previous edition.)

431.370
PB84-862663 PC N01/MF N01
National Technical Information Service, Springfield, VA.

Source: *Government Reports Announcements and Index (GRAI)*, v. 84, no. 11, May 25, 1984, p. 138.

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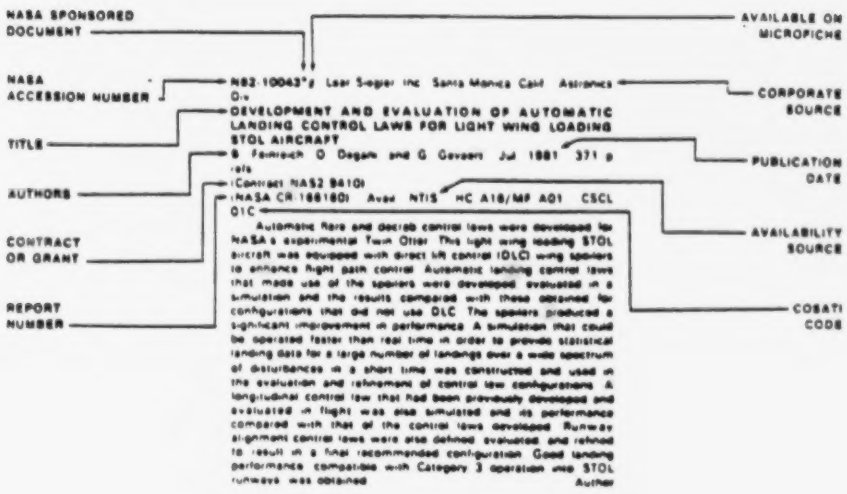
APPENDIX FIVE

Scientific and Technical Aerospace Reports: Sample Entry

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
N82-10043*# Lear Siegler Inc Santa Monica Calif Astronics Div
CORPORATE SOURCE
TITLE
DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT
PUBLICATION DATE
AUTHORS
B Fehrbach O Degani and G Gevaert Jul 1981 371 p refs
CONTRACT OR GRANT
(Contract NAS2-9410)
REPORT NUMBER
(NASA CR-166180) Avail NTIS HC A16/MF A01 CSCL 01C
AVAILABILITY SOURCE
COSATI CODE
Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control Automatic landing control laws that made use of the spoilers were developed evaluated in a simulation and the results compared with those obtained for configurations that did not use DLC The spoilers produced a significant improvement in performance A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed Runway alignment control laws were also defined evaluated and refined to result in a final recommended configuration Good landing performance compatible with Category 3 operation into STOL runways was obtained
Author

. Sample Page from Energy Research Abstracts

abilities from three independent measurements. The third model was an Ising type model employing a probability of nucleotide change based on the nucleotide composition of the nearest neighbors. Use of these models resulted in evidence to suggest that five methods of simulating the mutations in an evolutionary system produced results that primarily differed in the way in which nucleotide changes resulted in a pattern of amino acid changes.

17210 (BNL—33383) Autoxidative cytotoxicity: is there metal-independent formation of hydroxyl radicals. Are there crypto-hydroxyl radicals. Borg, D.C.; Schaich, K.M.; Forman, A. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 7p. (CONF-830785—3). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84006760.

From 3. international conference on oxygen radicals in chemistry and biology; Neuherberg, F.R. Germany (10 Jul 1983).

Several laboratories contend that reactions reducing free radicals reach directly with H_2O_2 to afford OH. in a metal-independent fashion, and others propose that often the strongly electrophilic reaction intermediate is either a metal-oxy complex or a crypto-hydroxyl radical (crypto-OH.) rather than OH., especially when lipid peroxidation is initiated. Our data imply that metal-independent OH. formation is not competitively significant in vivo and that adventitious metals probably were unrecognized in the reactions that prompted others to the contrary conclusion, while the confusing patterns of initiator and inhibitor reactivity that led to inferences of ferryl (or cupryl) intermediates or to the concept of crypto-OH. are explainable by the extremely short reaction radius of OH., which we show can be formed in lipid milieus that are inaccessible to hydrophilic or macromolecular scavengers.

17219 (BNL—34098) Structure of bound water and refinement of acid metmyoglobin. Raghavan, N.V.; Schoenborn, B.P. (Brookhaven National Lab., Upton, NY (USA)). Jan 1983. Contract AC02-76CH00016. 14p. (CONF-8206240—3). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84006541.

From Brookhaven symposium biology 33; Upton, NY, USA (1 Jan 1982).

The structure of myoglobin has been determined by x-ray diffraction for the acidmet, deoxy, and the oxy forms. Neutron diffraction work, done in this laboratory, has demonstrated that hydrogen and deuterium positions can be located. In addition to the localization of H and D, neutron diffraction provides a unique method for studying the water structure because of the strong scattering ability of D_2O. The scattering factor of deuterium is nearly twice as large as that of hydrogen, and it increases the visibility of water molecules in Fourier maps, so that in a neutron map a water molecule appears about three times as strong as in an equivalent electron-density map. (DT)

17220 (BNL—34143) Formation of oriented membrane multilayers of Na/K-ATPase. Pacheco, J.M.; Knott, R.; Edelman, I.S.; Schoenborn, B.P.; Wallace, B.A. (Columbia Univ., New York (USA). Dept. of Biochemistry; Brookhaven National Lab., Upton, NY (USA)). 1982. Contract AC02-76CH00016. 8p. (CONF-8206240—2). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84006544.

From Brookhaven symposium biology 33; Upton, NY, USA (1 Jan 1982).

The isolated membrane-bound enzyme retains its ouabain-sensitive ATP hydrolysis activity, and produces ATP-dependent Na^+ and K^+ fluxes when incorporated into phospholipid vesicles. The ultimate goal of the work is to determine its low resolution structure using both X-ray and neutron diffraction. A number of methods were used to impart lamellar stacking order to highly purified pig Na/K-ATPase membranes. Upon partial dehydration, x-ray diffraction from Na/K-ATPase membrane multilayers at 98% relative humidity yielded discrete reflections of 118 A periodicity, diffracting to $1/148\ A^{-1}$; additionally, continuous diffraction to $1/10\ A^{-1}$ was obtained. Subjecting the membrane multilayers to high magnetic fields improved the quality of the lamellar diffraction dramatically. Neutron diffraction studies of the partially dehydrated Na/K-ATPase membrane multilayers detected a mosaic spread of 2° when the samples were subjected to a magnetic field of 5 Tesla perpendicular to the membrane surface; the reflections were narrower than the camera line width, hence, the lattice disorder has also decreased significantly, although only four orders were measured.

17221 (DOE/ER/10889—T1) Development of a Ti plasmid vector for plant genetic engineering. Progress report, April 15, 1981-April 14, 1984. Chilton, M.D. (Washington Univ., St. Louis, MO (USA). Dept. of Biology). Feb 1984. Contract AC02-81ER10889. 8p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84007943.

The Agrobacterium Ti plasmids have the natural ability to insert a specific portion of their DNA, called T-DNA, into the nuclear genome of host plant cells, where it is maintained, replicated and transcribed into mRNA that is translated into foreign protein products. These pathogenic Ti plasmids in nature are acting as gene vectors, for they insert genes that benefit Agrobacterium in several ways. They encode novel enzymes that divert host plant metabolites into storage forms (compounds called opines) that are inaccessible to the plant and to other organisms, but that are specifically catabolized by Agrobacterium. Other genes in the transferred DNA (T-DNA) bring about elevated auxin and cytokinin biosynthesis, causing the transgenic cells to grow autonomously (increasing the size of the opine factory). The present project, begun three years ago, had as its objective the demonstration of the Ti plasmid pTi T37 as a gene vector for introduction of desirable genes into higher plants. Three obstacles had to be overcome to this end: (1) insertion of foreign DNA precisely into T-DNA (technically challenging because of the enormous size of the Ti plasmid); (2) developing a disarmed form of the T-DNA that would not cause cells to grow as tumors (a problem because tumor cells could not regenerate into complete plants); and (3) developing new selectable or screenable markers to allow facile isolation of the transformed cells containing genetically engineered T-DNA necessary because the tumorous trait is not usable in the disarmed vector. All of these objectives have been accomplished in the course of the last three years.

17222 (DOE/EV/03941—63) Mechanisms of recombination and function of DNA in bacteria. Progress report, January 15, 1983-January 17, 1984. Guild, W.R. (Duke Univ., Durham, NC (USA). Dept. of Biochemistry). Jan 1984. Contract AS05-76EV03941. 3p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84007212.

Studies on gene transfer in pneumococcus are described. Specifically transformation by chromosomal and plasmid DNAs, transfection by phage and plasmid DNA, and the novel kind of conjugative transfer of drug resistance elements among the chromosomes of streptococci are examined. Some of these elements appear to be transposons. There are numerous questions about their structure, functions, and relation to plasmids and other better characterized genetic elements. The experiments involve extensive use of transformation, cloning in both pneumococcal and E. coli systems, and analysis of DNAs by gel electrophoresis. For restriction mapping, we have concentrated on the insertion carrying genes for resistance to chloramphenicol and tetracycline.

17223 (LA—9816-PR, pp 4-6) Probing chromatin structure with DNase I. Prentice, D.A.; Tobey, R.A.; Gurley, L.R. Aug 1983. NTIS, PC A11/MF A01.

In Los Alamos Life Sciences Division's biomedical and environmental research programs. Progress report, January-December 1982.

A controlled, reliable, and sensitive method for using DNase I to examine chromatin structure was developed. With this probe, it was found that large differences in chromatin structure existed between cells blocked in their cell cycle by (1) isoleucine deprivation, which blocks cells in G_1 phase, or (2) sequential use of isoleucine deprivation followed by release into the presence of hydroxyurea, which blocks cells in early S phase. Curiously, when these two different cell cultures were mixed together during nuclei isolation, the DNase I digestion kinetics of each cell type were intermediate between that observed when their nuclei were prepared individually. Experiments mixing various cellular fractions with the nuclei prior to DNase I digestion revealed that there are diffusible cytoplasmic and nuclear factors present in cells which can modulate their chromatin structure.

Source: *Energy Research Abstracts*, v. 9, no. 9, May 15, 1984, p. 2315.